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February 12, 1955
VOL. 67, NO. 7 PAGES 97-112

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Waveguide

See Page 99

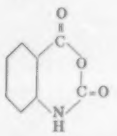
A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

the parent member of the isatoic anhydride series . . . tocopherol and an iron-bound policy . . . an idea for making extra copies of oscillograms

Extramural apathy

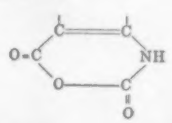
There was an inquiry from a customer as to whether we could supply isatoic anhydride:



Too frequently, perhaps, such an inquiry piques our curiosity enough to try out an idea or two. First thing we know, there is the compound, purified and in a bottle on the shelf. So we write back and tell the inquirer that we have it now, then find he doesn't really want it—just wondering if we could supply it, which is his privilege. That is how *Isatoic Anhydride* came into our list as Eastman 6975.

There, presently, one of our own chemists from another part of the enterprise noticed it and put in a requisition for a few grams. Shortly afterwards another of our laboratories wanted some. Then another internal requisition, and another. Apathetic though the rest of the world might be about *Isatoic Anhydride*, it was apparently doing us good inside.

Surely we are not alone in our interest in this echo of Baeyer's work of eighty years ago on indigo chemistry. *Isatoic Anhydride*, a creamy powder melting at 240 C with decomposition. The name, easily misread, is from *isatis*, Greek for woad. A little birdie called *Org. Reac.* has told us that the



grouping, which is characteristic of isatoic anhydrides as a class, reacts with hydrazine to make an excellent source of hydrazides of certain amino acids. Of course, what we are discussing here is only the parent member of the isatoic anhydride series and that doesn't make a particularly interesting amino acid hydrazide.

We stock some 3500 organic compounds in addition to Isatoic Anhydride. *They're all in our List No. 39, available without charge from Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).*

Offer

Vitamin E is one of the principal products of one of our plants. We have never sold as much as a milligram of it in dosage form. A great deal of our production goes out in 55-gallon drums to some of the world's most honored pharmaceutical houses. A fast-growing portion goes to manufacturers of animal feeds, not on the strength of scare advertising to farmers, but of sober and practical judgments stemming from research by the millers' own nutritionists and by the state agricultural colleges.

Yet, despite mountains of data, vitamin E plays its physiological role behind a tantalizing, exasperating veil. We do whatever we can to penetrate it, and we encourage as many other qualified investigators as we can reach to join us in the endeavor.

Though pure *d-α-Tocopherol* and *d-α-Tocopheryl Acetate* are sold for investigational use as Eastman Organic Chemicals, we are pleased to announce in this case an exception from an iron-bound policy that has made it possible to build up the great collection of research organics to its present stature in the world of science. The policy says that since *all* Eastman Organic Chemicals are intended for research, none can be made available gratis, however worthy the research.

Now we say that if you are engaged in biological experiments in which vitamin E is a major variable, we shall be happy to consider supplying without charge reasonable laboratory quantities of either the pure free tocopherol or its pure acetate. This material contains only the stereoisomer which occurs in nature, undiluted with associated lipids or isomers of lesser biological activity.

Inquiries and correspondence on scientific aspects of vitamin E should be addressed to Dr. Norris D. Embree, Director of Research, Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Plug

Reproduction is more to us than merely one of the basic biological functions; to us the word signifies the major market for our silver-sensitized paper. We read it literally to mean the copying of all manner of records and provide a large array of means, ranging from a little marvel of the age called the *Verifax Copier* (3 copies in 1 minute for less than 4¢ each) to simple sheets of *Kodagraph Contact Paper*.

A free plug for the latter, doubly welcome because we hadn't planted it, gladdened our eyes in a recent issue of *Electronics*. Little did it matter to us that the kind writer in his enthusiasm asserted a virtue for *Kodagraph Contact Paper* which even we have never claimed—that it requires only subdued room light instead of a proper darkroom for handling without danger of fogging. Just pleased that the fellow has a smart little scheme for using the paper in making inexpensive high-quality copies of cathode-ray tube oscillograms to include in manuals and laboratory reports.

For the details of his scheme, or for general guidance on the host of materials and methods for the photographic reproduction of intelligence, write Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

Kodak
TRADE-MARK

TECHNOLOGY

Talking Through Tubes?

A new two-inch tube with far greater capacity than coaxial cable can carry telephone conversations and television programs. It uses frequencies never before found practical.

See Front Cover

➤ HUNDREDS OF thousands of simultaneous telephone conversations may soon be crammed into a single two-inch pipe and transmitted for long distances on wave frequencies higher than have ever been used in communications.

The capacity of the new copper pipe, called a circular waveguide, exceeds that of the most modern eight-tube coaxial cable which can handle only 7,400 two-way conversations at a time.

The pipe, shown on the front cover of this week's SCIENCE NEWS LETTER, could also carry cross-country television programs. Ordinarily, one TV channel takes up the space of about 600 telephone contacts.

The frequency of the microwaves used in the tube ranges from 35,000 to 75,000 megacycles, up to seven times higher than had been found practical before.

In addition, the number of different frequencies that this tubing can carry is so huge that all conventional transmission wavelengths of all media could fit in its spread with ease.

But the seemingly limitless capacity of the tube is reduced greatly since each individual conversation or television channel must be widely separated to eliminate interference.

Stewart E. Miller, assistant director of radio research for Bell Telephone Laboratories at Holmdel, N. J., who developed the device, told SCIENCE SERVICE that his team's experiments with 500 feet of the tubing was the first demonstration that a circular waveguide is practical for long distance communication. He said he thought the tubes may be put into actual use in five to ten years.

Up to this time waveguides have only been used to transmit lower frequency signals for short distances, such as from the ground to the top of a radio tower. The most commonly used form is the rectangular waveguide, a box-like tube.

Great care, Mr. Miller pointed out, must be taken when bends are introduced into these tubes. Interfering echoes are set up when they are turned around a corner, but he offered two solutions to this problem. One would be to build insulated copper rings into the pipe at turns, which would be very expensive. The other would be to make the tube of fine coiled wire wrapped by a flexible outer coating.

Such tubes, which have been developed, could negotiate the bends without great losses, he said, and may eventually be the sort employed for long distance transmission.

The solid pipe used in the experiments presents other problems too. It must be perfectly straight. Even small dents cause considerable losses. Tiny factors, such as which way the tube is polished, circularly or lengthwise, also affect transmission.

The problem of turns does not arise in coaxial cables, which such tubing might supplement or replace.

Tiny super-high frequency waves that move through the new pipe have been almost entirely useless up until now. They are even too small for radar, since they bounce off dust particles and water droplets in the air.

Mr. Miller and his associates found, however, that the higher the frequency generated in the tube, the more efficient it becomes. Such super-high frequency waves were reflected back and forth inside a 500-foot-long pipe in the experiments. Tests showed that the loss in energy was so small that boosters would only be necessary every 25 miles.

After analyzing an impulse that had traveled a total of 40 miles back and forth inside the experimental tube, the Bell Laboratories engineers noted:

"The pulse shape was essentially the same as that of the transmitted pulse, although background noise became clearly visible. We certainly can conclude from this that circular electric wave transmission over great distances is possible."

The background noise, Mr. Miller said, can be easily eliminated.

These results were based on the work of Drs. S. A. Schelkunoff and G. C. Southworth, Bell scientists who discovered the method. (See SNL, May 9, 1936, p. 302.)

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VERTICAL JET TAKE-OFF—Two turbojet engines with their thrusts directed downward raise this experimental airplane from the landing field. When the plane is airborne, the jets can be switched to horizontal position, and it can fly like a conventional plane. The revolutionary craft, developed by Bell Aircraft Corp., was successfully flown recently in tests.

MARINE BIOLOGY

Imported Oyster May Start New Industry

➤ A COMMON European oyster may bring a new and prosperous shellfish industry to the northern coastal states of the United States and possibly to Canada.

The imported oyster is now living and reproducing experimentally in some areas along the shoreline of Maine and in some well-protected bays and harbors of the Pacific coast states. It was introduced into this country because scientists thought that it could be raised commercially in water that is normally too cold for native oysters.

Results of five years of experimentation with the immigrant oyster were reported by Dr. Victor L. Loosanoff, aquatic biologist of the U. S. Fish and Wildlife Service at Milford, Conn., in *Science* (Jan. 28).

The European oyster, known scientifically as *Ostrea edulis*, was originally received as a shipment of 9,000 individuals in 1949 from the Netherlands.

Science News Letter, February 12, 1955

DENTISTRY

Fluoride Tooth Paste

A NEW decay-checking tooth paste is expected to come on the market soon. This one will depend for its anti-decay action on tin fluoride.

"Early reports on new dentifrice are promising; let's hope the promise will be fulfilled" was the editorial comment on it given by the *Journal of the American Dental Association* (Feb.).

A year's trial of the new dentifrice by school children resulted in a decrease in the tooth decay rate of 50.6% in teeth that were free of decay at the time of first examination. Use of the tooth paste by the children was not supervised, so that they were using it just as they would use any dentifrice. It was equally effective at different ages.

The dentifrice was given to 209 children whose teeth at the beginning and end of the year's trial period were examined and compared with a control group of 214 children. These 214 also got a special dentifrice which was identical with the decay-checking one except it did not have any fluoride in it.

These studies were made by Drs. Joseph C. Muhler, William H. Nebergall and Harry G. Day of the School of Dentistry and department of chemistry, Indiana University, Bloomington, Ind., and Dr. Arthur W. Radike of Ohio State University College of Dentistry, Columbus, Ohio. They were supported in part by a grant from the Proctor and Gamble Company, Ivorydale, Ohio.

A similar trial is reported under way in Cleveland. Dental scientists and health authorities will be particularly interested in results of this second test, because so many dentifrices have shown great promise on their first trial, only to prove disappointing later.

Putting a fluoride into a dentifrice follows the earlier discovery of the tooth decay checking power of fluorides occurring naturally in drinking water. Many communities are now putting carefully measured amounts of fluoride into the drinking water, to give the benefit of its anti-decay action to children as their teeth are forming.

Fluoride is also put onto the teeth of school children by many dentists as an anti-decay measure.

Putting it into a tooth paste might give the "ideal" way to use it, Dr. Muhler and associates said in reporting their studies to the journal.

They favor it because people would get the fluoride on their teeth oftener and more conveniently than by going to the dentist for fluoride treatment.

Whether the fluoride tooth paste would provide too much fluoride for persons living in regions where the water has fluorine in it naturally or by controlled addition is a question still to be decided. The decision of this point which may involve a Food and Drug Administration requirement of special labelling is believed to be one thing holding up marketing of the new tooth paste.

Putting fluoride into the drinking water is favored by health authorities who point out it is the best way of being sure all the people of the community get the decay-fighting benefit of fluorides. Whether or not they brush their teeth or go to the dentist, they all drink water.

Science News Letter, February 12, 1955

PHYSICS

A-Waste Put to Work

HOW MAN is learning to live in a more radioactive world is revealed in the 17th semi-annual report of the Atomic Energy Commission.

Fission products which have accumulated in large quantities from atomic reactors have been put to work supplying small portable and potentially deadly sources of radioactive rays which will perform such different services as treating cancer and keeping potatoes from sprouting.

Cesium, an element rarer than gold and known chiefly from analysis of the water from mineral springs, is separated from the fission products for use of the rays it gives off. It is packaged as a disc the size of a fifty-cent piece and about as thick as a woman's powder compact. The case is of stainless steel, made double to protect against leakage of the salt-like contents.

This small package holds the equivalent in treatment power of radium which would be worth $20,000,000 if there were that much radium in the world.

Other rare elements available from atomic processes, which have been known before only in trace amounts, include gadolinium, europium, and dysprosium. These have found uses, because their oxides glow when heated, resembling lime in "lime-light" quality. They are used as cores in searchlight carbons and motion picture projectors. They also combine with glass used in sunglasses to give protective tints, and to give special properties to camera lenses.

For detection of dangerous quantities of radiation, two new instruments have been devised. One is a scintillation counter large enough to surround a person, so that the entire amount of radioactivity in his body is made visible at one time. New chemicals which will shine when irradiated have been developed for use with this counter, so that a total of 77 satisfactory ones are now known.

The other new instrument is a gas-filled counter containing helium with or without nitrogen which works at high speeds which would be too much for conventional counters.

Effect of radiations on plastics is shown to be of two kinds. Nylon proves to be strengthened like polyethylene, due to "cross-linking" which the radioactive rays promote, but plastics similar to Dacron are weakened by such treatment. Heavy doses of radiation, however, harm all plastics, the report stated.

A new building at Oak Ridge, Tenn., will be built soon to separate and purify fission products for these and other uses. It will expand the "hot chemistry" facilities and serve as a pilot plant for industrial installations.

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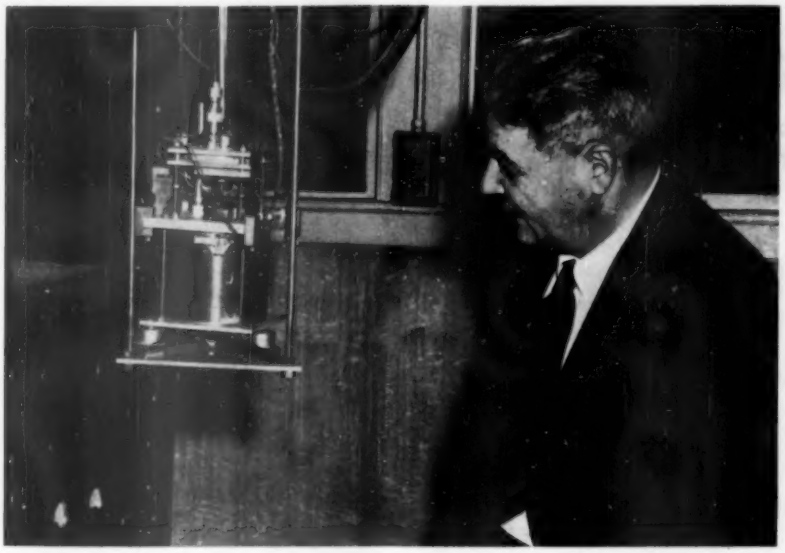

GOT THE TIME?—One of the new "atomic clocks" which are the most accurate time-measuring devices in the world is controlled by oscillation of cesium atoms. (See SNL, Feb. 5, p. 83.) The device developed by Dr. Jerrold R. Zacharias, director of the Laboratory for Nuclear Science at MIT, was built as a scientific tool for communication, astronomical, navigation, and geophysical studies. He is working on a new model so precise that if it had been running since the birth of Christ it would be only a half second "wrong."

MEDICINE

Drugs Near A-Blast Safe

➤ IN THE event of an atomic bombing, drugs as close as 1,000 yards to the explosion will be safe for immediate use if their containers have not been damaged.

Only exceptions are insulin for diabetes and vitamin B-12 for pernicious anemia.

This reassurance comes from the U. S. Food and Drug Administration which tested 42 common drug preparations exposed to two shots in the Upshot-Knothole series of bomb tests in Nevada in the spring of 1953.

Insulin was reduced in potency by about 10% and vitamin B-12 by about 50%. Protamine zinc insulin, however, showed no reduction in potency of heavily exposed samples.

The drugs tested included ether; salt and sugar solutions and the blood extenders dextran and PVP, all of which might be needed to treat shock; morphine and some other pain-relieving drugs, including aspirin; amyl nitrite, nitroglycerin and a digitalis preparation for heart diseases; a sulfa drug and the chief antibiotics for fighting disease germs; cortisone; two stomach ulcer medicines; the sleeping pill phenobarbital and its relative thiopental sodium often used as an anesthetic; and rickets-preventing vitamin D for babies and small children; anti-bleeding vitamin K, and folic acid.

Many of the drugs did become radioactive. This induced radioactivity was still present several months later. A significant amount of it was due to chemicals, such as calcium phosphate, used to give the drug chemical form or consistency for use as a medicine. Some was due to minerals in the drug itself.

All the chlorine-containing drugs, such as the salt solutions and some others used to inject fluids into the veins, become radioactive by transmutation of some of the chlorine to sulfur 35.

Clear glass containers that were heavily exposed turned quite dark. This was due to induced radioactivity and could serve as a warning signal that the bottle or jar had been exposed to heavy doses of radioactivity.

The amount of radioactivity induced in the drugs was so slight that there would be little or no health hazard from it in the normal use of the drugs. However, there might be danger in use of massive doses of atropine to combat nerve gas poisoning and in use of large amounts of some of the fluids given into veins to combat shock.

Drugs with a high sodium content should be allowed to "cool" several days after exposure before they are used.

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The *prairie chicken*, once numerous over large areas from the Appalachians to the Rockies, is now so scarce that only two states, Nebraska and South Dakota, allow hunting of the birds.

PHYSICS

Rubber Is Vulcanized With Gamma Radiation

➤ RUBBER VULCANIZED without heating and without addition of sulfur has been produced by exposing an experimental rubber to the short gamma rays given off by cobalt 60.

New possibilities for vulcanizing rubber machine parts in place, by bringing the cobalt source of gamma rays to the job, may be foreshadowed by the discovery of this new method. The use made of it at present by the Air Research and Development Command is in making special rubbers which are not harmed by hot oil or made brittle by cold weather.

Fillers such as carbon black and zinc oxide, which improve the quality of rubber for tires and other large scale consumer uses, also improve the rubber cured by the new irradiation process. But the traditional method of vulcanization, discovered by Charles Goodyear, has been matched by atomic radiation similar to X-rays.

Working at the laboratories of the Air Research and Development Command at Wright-Patterson Air Force Base, Dayton, Ohio, the discovery of the new process was made by Wallace Jackson Jr., of Springfield, Ohio, materials and chemical engineer, and Denver Hale, of Dayton, who made the gamma-radiation research. The research team discovered the new process while trying to harden a new type of experimental rubber, one of a number of synthetic formulas not yet ready to be announced.

After conventional methods of hardening the experimental rubber failed, gamma rays were tried as a last resort. Success with the unusual experimental rubber prompted the research team to try the gamma ray technique on other synthetic and natural rubbers. Only one kind, a synthetic rubber known as poly-iso-butylene, proved resistant to the new vulcanization method.

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AGRICULTURE

Oiling Dried Alfalfa Saves Vitamin's Parent

➤ ALMOST HALF of the nutrient in alfalfa meal needed by poultry and livestock to make vitamin A can be saved by treating the meal with animal fats.

The nutrient is carotene, a pro-vitamin that animals convert into vitamin A, needed for good growth and reproduction. When alfalfa is cut and dried and then stored as a feed meal, as much as 50% to 75% of the carotene combines with oxygen and disappears.

U. S. Department of Agriculture scientists reported in *Agricultural Research* (Jan.) that in recent tests the meal treated with five percent of animal fats retained nearly twice as much of the carotene as did untreated meal.

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MEDICINE

Chemical Helps Mental Ills

Reserpine, obtained from an Indian root, may replace brain surgery and shock treatments. It has a tranquilizing action.

➤ A DRUG from an Indian root may successfully replace brain operations and shock treatments in many cases of mental disease, it appears from reports by many doctors to a New York Academy of Sciences conference in New York.

The drug is reserpine. It first became famous as a medicine for reducing high blood pressure. One of its most notable effects is a tranquilizing, or quieting, action.

Whether reserpine will become a cure for mental sickness cannot yet be told, since it has not been used long enough. But doctors seemed to agree that at the very least it would make patients better adjusted to life in a mental hospital and decrease by as much as 50% the number of man-hours needed to care for some of them.

Results called "astounding, even to psychiatrists of long clinical experience," were reported by Dr. Leo E. Hollister and associates of the Veterans Administration Hospital, Palo Alto, Calif. Dr. Hollister and associates gave the drug to 127 suffering from schizophrenia, one of the most serious mental diseases and one which accounts for almost half of the nation's mental hospital population. Most of these patients had been sick for at least nine years.

Of this group of very sick patients, five could be released from the hospital following treatment.

Equally striking results were obtained in extensive studies conducted at the Manteno State Hospital, Manteno, Ill., by Dr. Dean C. Tasher, chief, and Dr. Marianne Wallenberg Chermak, clinical director. In one group of 100 women with schizophrenia, reserpine produced positive results after shock treatment had been used for some time without satisfactory results. Some of the patients were highly antagonistic and destructive, others severely withdrawn prior to treatment with reserpine.

All of these patients, reported Dr. Tasher, have improved in degrees ranging from better adjustment to institutional life through complete social recovery and discharge from hospital.

Old patients with mental sickness that made them irritable and difficult to manage were transformed into pleasanter, more cooperative persons after treatment with reserpine, Dr. Anthony A. Sainz reported of studies at the Mental Health Institute, Cherokee, Iowa. Dr. Sainz is now with the VA Hospital and Psychopathic Hospital, Iowa City.

Of a test group of 89 patients in the study, Dr. Sainz reported that 61 were considered having undergone "remissions," that is, the disappearance of more than 75% of their symptoms.

Agitation, irritability and quarrelsomeness, principal complaints of the patients, disappeared uniformly in six to 24 hours after the drug had been taken. These symptoms lessened sharply in the testing periods of from one to six months during which reserpine was administered daily.

As a result, Dr. Sainz said, hospitalized patients as well as those who were cared for at home, required less attention. It was noted that the man-hours spent by psychiatric aides, nurses and doctors on such patients was decreased by an average of 50%.

Reserpine is unlike other drugs acting on the brain and central nervous system and shows a "basically new principle" of drug action, Drs. J. A. Schneider, A. J. Plummer, A. E. Earl and R. Gaunt, of Ciba Pharmaceutical Products, Inc., Summit, N. J., reported on the basis of their neurological studies.

Ciba markets its brand of reserpine under the tradename Serpasil. Reserpine was isolated by Ciba's Dr. Emil Schlittler in the firm's Basel, Switzerland, laboratories, in 1952.

Science News Letter, February 12, 1955

• RADIO

Saturday, February 19, 1955, 5:00-5:15 P.M. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Frank Glenn, surgeon-in-chief of New York Hospital, professor of surgery of Cornell Medical College, and head of department of surgery of New York Hospital, Cornell Medical Center, will discuss "Advances in Surgery."

MYCOLOGY

Chemical Controls Important Crop Blights

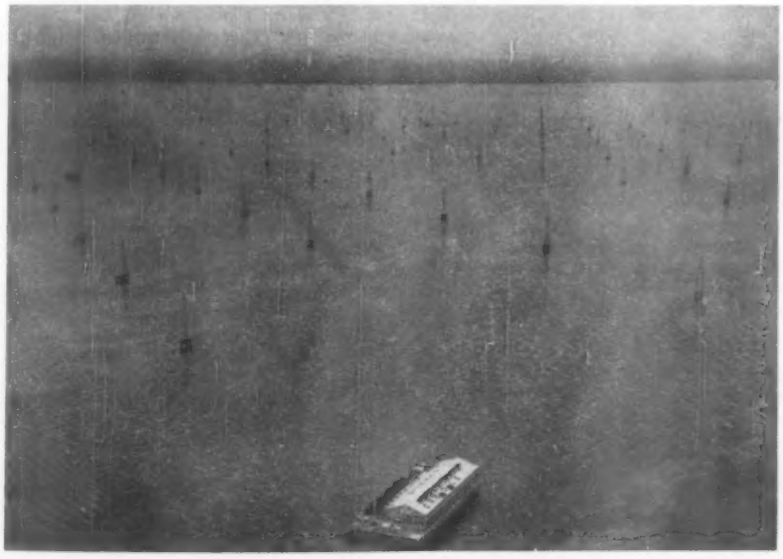
➤ A CHEMICAL that promises effective control of important fungus-caused blights of fruits, vegetables and other plants was announced in *Science* (Jan. 14).

Called B-622 in the field tests, this chemical represents a new class of fungicides, which are s-triazine derivatives. It was found effective in actual growing tests against apple scab, celery early blight, muskmelon leaf spot, onion-foliage diseases, leaf diseases of ornamentals, potato late blight, tomato anthracnose, dollar spot, and diseases of turf which are caused by *Helminthosporium*.

Chemically it is 2,4-dichloro-6-(o-chloroanilino)-s-triazine.

This development was reported by Calvin N. Wolf of Ethyl Corporation research laboratories, Detroit, Paul H. Schuldt, Boyce Thompson Institute, Yonkers, N. Y., and M. M. Baldwin, Battelle Memorial Institute, Columbus, Ohio.

Science News Letter, January 29, 1955



SHOT IN THE ARM—Oil wells pepper the waters of Lake Maracaibo in Venezuela, the world's second largest oil producing area. The plant, shown at the bottom of the picture, traps escaping gas at the rate of 154,000,000 cubic feet daily from the wells and injects 137,000,000 cubic feet right back into the oil formation. This makes the strata give up one-third more oil. The remaining gas is used to run the plant's machinery.

GENERAL SCIENCE

Research of STS Winners

Final 40 competitors for the Westinghouse Science Scholarships will demonstrate their independent scientific projects in Washington. They vie for $11,000 in scholarships.

➤ FORTY HIGH school seniors, possibly tomorrow's leaders in the world of science, will meet in Washington on Feb. 24 for five days during which they will take part in the Science Talent Institute.

They will bring with them exhibits demonstrating their scientific projects which helped win them a place among the top 40 in the country-wide competition.

They will compete for $11,000 in Westinghouse Science Scholarships. Here are descriptions of a few of the projects they that helped win them the trip:

Radiation Photographs

➤ PHOTOGRAPHING RADIOACTIVE samples on special emulsions made for nuclear studies formed the scientific project of 17-year-old Roald Hoffman, senior at Stuyvesant High School, New York.

When exposed to the special photographic plates, particles from the radioactive samples leave a distinct pattern, known as tracks, on the emulsion. In describing one experiment with thorium salts, the young scientist reported, "the plate contained a large number of stars. These stars were created by the radioactive decay of the thorium."

Roald explained that the unstable thorium salt emitted six alpha particles and four beta particles. Each of the alpha particles has a different energy level. By measuring the alpha tracks on the photograph, Roald could tell from which parent nucleus the alphas were emitted. This technique, the teenager stated, is widely applied in the study of nuclear physics.

The young student hopes some day to become a medical doctor and to do research work. As a second choice of a career, he said that he is interested in becoming a psychiatrist.

Builds Own Radar Set

➤ BELIEVING THAT you can do something about the weather other than talk about it, David Karl Nergaad has built his own radar set to study the weather. He hopes to set it up in the tower of his high school in Princeton, N. J.

An 18-year-old senior, he hopes some day to become a research physicist. He built his three-centimeter radar set after he studied meteorology and became interested in the use of radar for weather studies.

The set is capable of receiving reflections from as far away as ten miles. He described its construction and studies made with it in a report of his scientific project, required for eligibility as a Search candidate.

The teen-age researcher explained that he wants to move the set from his home to the tower of Princeton High School, because the surrounding landscape in the valley in which he resides does not permit full use of the set's range.

He has, however, in addition to tracking the weather, received reflections from cars up to one-half mile away.

Studies Star Clusters

➤ CLUSTERS OF stars whose brightness varies regularly in periods of less than a day were studied by James Halbert Havey Jr., 17-year-old son of an Air Force officer.

Young Havey, a senior at Grant Union High School in Del Paso Heights, Calif., calculates the possible structure of variable stars with periods of less than a day, and the relation of such structure to the changing light received from them. The teenage researcher hopes to be able to continue investigation on this topic in the future.

Discovers New Fossil

➤ A FOSSIL species, never before reported, was discovered by Charles Jetter Eichman, 17.

Uncovered along the cliff of a ravine at Haddonfield, N. J., the fossil was named *Emarginula ladowae*, in honor of Dorothy S. LaDow of Woodbury, N. J., whom the young scientist reported is a friend and inspiring naturalist. It is a fossilized shellfish belonging to the same class as slugs and snails.

A description of the new species has been accepted for publication by the Academy of Natural Sciences of Philadelphia. John Dyas Parker, assistant to the editor of the Academy's publication, wrote to the senior at Audubon High School, Audubon, N. J., telling him that the discovery "upsets" some "preconceived notions" concerning the rise of this type of shellfish, "which had never before been found living" prior to about the middle Eocene period or approximately 50,000,000 years ago. Jetter described his new fossil as being more than 63,000,000 years old, belonging to the upper Cretaceous period.

Solid Fuel Engine

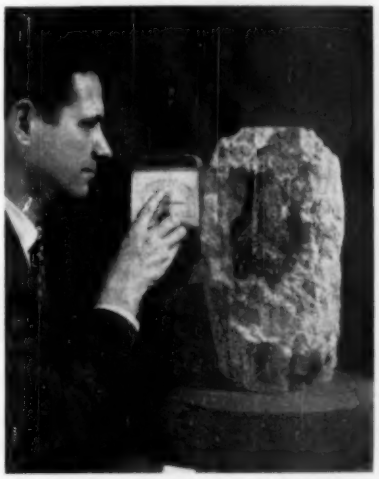
➤ DESIGN AND construction of a solid fuel internal combustion engine was accomplished by Lawrence Ernest Williams, 17, who is a senior at East High School, Youngstown, Ohio.

Gaining his interest in solid fuel engines from the story of Rudolph Diesel's early attempts to market a compression-ignition engine which used powdered coal, Lawrence began to experiment with combustion of solids. His experiments to find a highly combustible solid fuel involved the testing of coal, sugar, wood, flour, starch, ash, various chemicals and coffee crystals. The best fuels to use, the young scientist discovered in his studies were dehydrated starch and coal dust.

Lawrence said that an engine operating on solid fuel might be used economically for such things as earth-moving equipment in the world's underdeveloped areas. The teen-ager would like to become an aeronautical engineer and some day do research in the field of rockets.

Descriptions of more scientific projects submitted by the top 40 Science Talent Search competitors will be published in the next issue of the SCIENCE NEWS LETTER.

Science News Letter, February 12, 1955



EIGHTY PERCENT URANIUM— This 103-pound rock, one of the largest specimens of high grade uranium ore, on display at the American Museum of Natural History in New York. It is colored a brilliant orange and yellow with black spots. Its circumference is about 24 inches and it is about 19 inches long. As ore it is worth $1,000. Dr Brian H. Mason, curator of physical geology and mineralogy for the museum, tests the ore with a Geiger counter. The stone was a gift of Vernon J. Pick, who struck it rich near Hanksville, Utah.

GENETICS

Radiation Damage Found Ten Times Greater

➤ RADIATIONS FROM atomic bombs, radioactivity and X-rays are a ten times greater menace in causing hereditary changes than heretofore estimated, it is suggested in the AEC's 17th semi-annual report.

Experiments at the Oak Ridge National Laboratory show that mutations in mice as the result of radiation occur at a ten times greater rate than those observed in fruit flies, on which most of the estimates of radiation damage to human heredity have been based.

The changes in hereditary constitution due to these mutations or permanent changes in the germ cell make-up are one of the most feared long-time consequences of too much radiation, such as might be spread in the world by an excessive number of A and H bombs in war or peace or too much atomic power reactor debris.

The AEC has revised its estimates of the genetic hazards of radiation to human beings as consequences of its mouse tests with X-irradiation at high dosages of 300, 600 and 1,000 roentgens. It is continuing its testing of the mutation rate in mice using lower doses of radiation such as might actually be encountered.

Science News Letter, February 12, 1955

PALEONTOLOGY

Prehistoric "Horse" Bones Found in Wyoming

➤ FOSSILS FROM a prehistoric land of lush vegetation and grassy plains, over which ranged herds of the earliest known horse, have been unearthed in southwestern Wyoming, the Smithsonian Institution disclosed. The area is now relatively arid, sagebrush territory.

The ancient horse, *Hyracotherium*, was not very much of a horse by modern standards. It was about the size of a shepherd dog and, unlike modern horses, it had four functional toes. Similar fossils have been reported in France.

Most abundant in the find, representing animals that lived between 50,000,000 and 70,000,000 years ago, were remains of a creature about the size of a sheep, called *Meniscotherium*. It has no living descendants.

The fossils, found by Dr. C. L. Gazin, curator of vertebrate paleontology at the Smithsonian Institution, and his associate, Franklin Pearce, also showed the existence of a creature about the size of a collie dog, believed to be very distantly related to the rhino. It was perhaps the first of a race of giant animals, the titanotheres, which developed in the following millions of years, then became extinct. These giants were probably a dominant animal wherever they existed.

Besides these animals, which were all presumably grazers, Dr. Gazin collected teeth and other fossil bones of early tree-dwelling primates related to the lemuroids and tarsioids. Man, along with the monkeys and apes, are members of this primate stock. Bones of squirrel-like rodents were also found.

Dr. Gazin said that he has not yet identified all the fossils but would begin analysis soon.

The site of the find was the so-called Cathedral Bluff tongue, where during the early Eocene and late Paleocene ages river deposits were becoming interfingered with sediments of the long extinct Green River lakes. Dense temperate zone forests are believed to have existed then, when modern groups of mammals were first establishing themselves.

Science News Letter, February 12, 1955

TECHNOLOGY

Activated Carbon Made From Peanut Shells

➤ ACTIVATED CARBON, an extensively used purifying agent, can now be produced from peanut shells.

The porous black substance, used as a filter in gas masks and to decolorize such substances as cane sugar, was produced by powdering the peanut hulls and heating them in a steel rotary kiln.

A dry yield of 34.9% was reported when the hulls were carbonized at 300 degrees Centigrade for an hour, then activated with steam in the same kiln at 700 degrees Centigrade for two hours. The hulls were first treated with ammonium phosphate.

Without this added chemical, yields dropped to 26.9% and an inferior product was obtained. The scientists found that powdering the hulls increased the power of the activated carbon to attract, or adsorb, impurities.

The work was reported by Frank C. Vilbrandt, professor of chemical engineering, and his associate, Stephen M. Gano to the Virginia Polytechnic Institute, Blacksburg, Va.

Science News Letter, February 12, 1955

DENTISTRY

Find Heat, Cold Equal As Pain Stoppers

➤ HEAT AND cold are about equal in their effect on pain, inflammation and speed of healing, Dr. Abraham Possoff of Chester, Pa., reported to the *Journal of the American Dental Association* (Feb.).

He reported on 60 patients at the Veterans Administration Hospital, Aspinwall, Pa., who each had on the average 23 teeth pulled. Some got heat from an infrared lamp while others had cold from an ice bag. At the end of the 24 hours there was little difference between the groups in pain, tenderness or general discomfort.

All of the patients also got penicillin, warm salt mouthwashes and sedatives as post-operative treatment.

Science News Letter, February 12, 1955

IN SCIEN

MEDICINE

Unborn Gland Grafts for Skin Disease, Cancer

➤ GRAFTS OF unborn glands are seen as a possible future way to help patients with hopeless cancers, among them child victims of leukemia. Such grafts have already brought "striking improvement" to four of six patients with a serious skin diseases.

The glands are the adrenal glands. The two-way hope foreseen from the grafts comes because the adrenal gland hormone, cortisone, has helped both the skin disease and the cancer victims.

Trial of the unborn gland grafts in the skin disease patients and work looking toward their use in cancer has been done by Drs. Freddy Homburger and C. D. Bonner of Tufts College Medical School in Boston under a grant from the American Cancer Society.

The number of cases which can be treated is severely limited by the number of fetal adrenals available. These glands, which lie atop either kidney, must be removed and transplanted promptly while they are still alive. They are obtained from the victims of early miscarriage or spontaneous abortion not due to diseases which would make their use dangerous to the new host.

The scientists have reported using the glands in cases of pemphigus foliaceus, pemphigus vegetans, atopic dermatitis, parapsoriasis, disseminated lupus erythematosus and seborrheic dermatitis.

Science News Letter, February 12, 1955

TECHNOLOGY

Wire Insulator Is Developed for Motors

➤ DESIGNERS CAN now make more powerful motors without increasing their size by using a new thin-film wire insulator.

Even small motors contain coils with a mile or more of copper wire that must be insulated against contact. The new insulator is a resinous substance, known technically as a cross-linked polymer. It can be applied with standard enameling equipment.

It is abrasion- and solvent-resistant and can be expected to stand up many years under temperatures as high as 300 degrees Fahrenheit. This is about 75 degrees higher than was previously possible with a comparable coating. Heat is one of the greatest enemies of electrical insulators.

The product, called Alkanex, was developed under the direction of Drs. A. L. Marshall and John R. Elliott of the General Electric Research Laboratory, Schenectady, N. Y.

Science News Letter, February 12, 1955

CE FIELDS

AGRICULTURE

Jobs Being Offered to Identical Twin Calves

➤ WANTED: IDENTICAL-TWIN beef calves. Must be five months or younger and live within 200 miles of the nation's capital. Exceptional room and board. Good retirement program. Apply U. S. Department of Agriculture.

As many as 12 pairs of identical-twin calves are urgently needed by the Department's scientists for feeding experiments at the agricultural research center, Beltsville, Md.

In past beef-cattle nutrition experiments at the center, 27 pairs of identical twin calves have been used. The additional calves are wanted for a new series of tests to begin this spring.

Identical twins, the researchers say, develop from a single fertilized egg and are always of the same sex. Experimenting with the twins permits research to be done faster and at less cost because the results are just as reliable as tests made with several animals.

"The Department will buy twin calves on an offer-and-acceptance basis," they reported, "depending on their suitability and the price asked by the owner."

"Purebred or grade beef animals, and even crossbreds sired by beef bulls are acceptable," they added.

Science News Letter, February 12, 1955

MEDICINE

Repair Hip Joints With Living Gristle

➤ LIVING GRISTLE can be fashioned into caps for repair of diseased hip joints, Dr. John J. Flanagan of South Orange, N. J., announced at the meeting of the American Academy of Orthopaedic Surgeons in Los Angeles.

Metal, plastic and fascia from thigh muscles have heretofore been used for this purpose with varying degrees of success. Dr. Flanagan for years has been trying to find a better solution to the problem by developing a cap of living tissue such as exists in a normal joint.

The living gristle, or cartilage, cap has so far been used on only four patients and Dr. Flanagan stressed that more time is required to see how it will stand up over a long time.

The first patient, a 43-year-old practical nurse, underwent the hip-joint operation three years ago. Today she is working regularly and has excellent function of the hip without pain. One of the four operations was performed on a 12-year-old girl, suffering from degenerative arthritis, and so far the results are encouraging.

Since no source of cartilage of the size needed is available in the human body, Dr. Flanagan "borrowed" an idea from the plastic surgeons and constructed a perforated Vitallium mold which would hold bits of diced cartilage taken from a patient's ribs. He implants the mold, containing the cartilage, in the abdominal wall for a period of four months. During this time the cartilage cells proliferate and grow together, making a smooth cartilage cap in the shape of the mold.

Tiny blood vessels penetrate perforations in the mold and nourish the cartilage to keep it alive. Then the cartilage cap is removed from the mold and placed over the thigh bone which it has been tailored to fit.

Dr. Flanagan is presently working on a method whereby he hopes to transplant the diced cartilage directly without the abdominal wall implantation. He is also studying the use of cartilage that has been preserved in cartilage banks.

Science News Letter, February 12, 1955

METEOROLOGY

Electronic Brain Will Soon Predict Weather

➤ ELECTRONIC COMPUTERS, the so-called "giant brains," can be used to analyze weather maps, a step in forecasting previously done only by humans. The computer's results were at least as accurate as those of a meteorologist, Dr. Bruce Gilchrist of the Institute of Advanced Study, Princeton, N. J., told the American Meteorological Society in New York.

His disclosure brings much closer the day when the bulk of weather forecasting jobs will be done entirely by man-made devices. Most of the techniques for accomplishing this are already available, Dr. Gilchrist said, but the analysis problem was one question that had to be answered before a completely objective method was developed for taking the last step of getting from current data to a weather forecast.

Weather forecasters spend most of their time plotting and analyzing current data, a necessary step before making their forecasts. The electronic computer can do this same job accurately, and apply the calculations to its own forecasts for the next 24 hours, within an eight-hour day, Dr. Gilchrist said.

Dr. George P. Cressman, also of the Institute for Advanced Study, and of the Air Weather Service in Washington, collaborated with Dr. Gilchrist in making an analysis and forecast within a working day, using the electronic computer at the Institute.

Only one other person, a key punch operator who transferred weather data from the teletype, assisted them. Having shown that a computer can provide its own analysis of data that it will use in weather forecasting, Dr. Gilchrist is now working on predicting the weather for the entire Northern Hemisphere by giant electronic "brains." He expects to run an actual prediction within the next few weeks.

Science News Letter, February 12, 1955

MEDICINE

See Better Treatment For Detached Retina

➤ BETTER TREATMENT of detached retina, in which visual sense cells become separated from the rest of the eye, is foreseen as the result of research at the Medical Center of the University of California at Los Angeles.

Dr. Ralph Gunter and John Sinclair are doing the research which was made possible through a U. S. Public Health Service grant to Dr. Wilbur Selle, professor of biophysics, and Dr. Samuel R. Irvine, associate clinical professor of surgery (ophthalmology).

It is often possible to restore vision by a delicate cauterizing procedure in cases where the retina has become detached from the supporting layers of the eye because of an injury. This is done by sending current through a tiny electric needle into the retina, thus producing a condition in the supporting layers to which the detached retina will again adhere.

However, little is known about sensitivity of eye tissue to varying amounts of current, and instruments presently used to regulate the flow of current are not precise. As a result of this fact the outcome is hard to control.

The investigators are correlating data on eye tissue sensitivity to varying amounts of current with successful cauterizing procedures in experimental animals and clinical cases at the Los Angeles V.A. Center.

With the aid of such data they plan to design a device in which current resistance in eye tissue would automatically regulate the flow of current, keeping it at the desired level. If successful, the device should take the element of risk out of such operations.

Science News Letter, February 12, 1955

ICHTHYOLOGY

Long-Finned Tunny Caught in British Seas

➤ THE ELEVENTH long-finned tunny fish caught in British seas in more than 108 years and the first since 1947 has been reported.

The long-finned tunny, also known as the albacore or germon, is essentially a warm-water species ranging widely through the Atlantic from Massachusetts to the West Indies and from the Orkneys to the Cape of Good Hope, and entering the western Mediterranean.

First recorded as having wandered into British waters "several years" prior to 1846, the latest long-finned tunny was captured alive in a shallow pool at low tide at Morecambe, Lancashire, in northwest England on Aug. 14, 1954.

A description and photograph of the fish was reported in *Nature* (Jan. 22) by Denys W. Tucker of the Natural History section of the British Museum, London.

Science News Letter, February 12, 1955

MEDICINE

Problems of the Heart

Atherosclerosis, high blood pressure and rheumatic fever account for nine out of ten sick hearts. Finding the basic causes of these disorders is the chief aim in heart research.

By JANE STAFFORD

➤ PROBLEMS OF the heart on Valentine's Day traditionally concern romance. But for many millions of Americans, the big heart problem is how to keep the flesh and blood pump in the chest ticking on year after year.

These victims of true heart-sickness are getting much help. Medical men and surgeons, chemists and bacteriologists, even atomic scientists and automotive engineers, have teamed to fight the greatest of all disease killers, cardiovascular disease. In layman's terms that means diseases of the heart and blood vessels.

Consequently, even though some 10,000,000 Americans suffer from heart and blood vessel disease, three-fourths or more who suffer a heart attack recover from the first attack and survive, on the average, eight years or a little longer. Patients stricken by apoplexy from a blood clot on the brain are being protected from future strokes by some of the newer medicines and there is even hope that the drugs may help toward recovery from strokes. And though rheumatic fever, forerunner of rheumatic heart disease, affects about a million young Americans, sulfa drugs and penicillin are saving these young people not only from premature death but in very many cases from heart damage.

Causes Inflammation

Rheumatic fever makes hearts sick by causing an inflammation in the heart that results in scarring of its valves or of its muscle wall. Valves with scars on them do not work well. Either they leak or they block blood flow. Depending on how severe the scarring is, the consequences may range from slight to serious, including invalidism and premature death.

Doctors have known for long that a youngster might come through one attack of rheumatic fever with little or no heart damage, but that second and third attacks were sure to leave their scars. For some years, too, there has been knowledge that germs of the streptococcus family played a part in rheumatic fever. An attack of the fever, it was discovered, almost always came after a strep. infection. This was a most important discovery because there now are drugs, such as sulfa drugs, penicillin and other antibiotics, that stop the streptococci.

These drugs are now being used in several ways to protect hearts from strep. damage. One way is to give them continuously after the first attack of rheumatic fever to ward off further attacks. Another, newer way is to give them early and vigorously as soon as a strep. infection develops, to prevent even the first attack of rheumatic fever.

New combinations and forms of these strep.-fighting drugs have been developed so that they no longer need be taken three or four times daily for months and years.

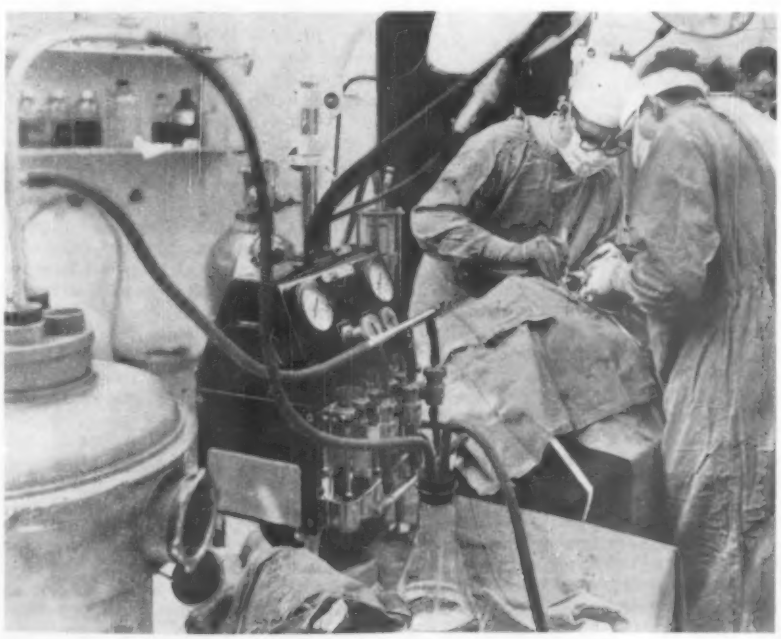
Young hearts and lives are being saved through these findings, but for the future there is hope that even more can be accomplished. Many people, young and old, get strep. infections, but only three out of every 100 infected come down with rheumatic fever. Scientists, therefore, are seeking the factor in some human bodies, whether in the glands or other body organs and mechanisms, that make some respond to strep. infection by getting rheumatic fever. Another line of research involves the strep. germ itself. Since it is not found at the inflamed spot in the heart, scientists assume that it does its damage by some chemical or poison that it produces. If such a poison can be discovered, development of an antidote to it might follow.

Rheumatic fever is one of the Big Three that damage and stop hearts. You have read of the congenital heart defects which are being repaired by "blue baby" and similar operations. You may have heard that there are 20 forms of heart disease. But the three that cause nine out of 10 heart deaths are: rheumatic fever, atherosclerosis and high blood pressure.

Spots on Arteries

Of all the deaths caused by heart and blood vessel diseases, more than half are due to atherosclerosis. This is a form of hardening of the arteries. Normally, the lining of the arteries is smooth, so the blood can flow easily and steadily along to all parts of the body. But in atherosclerosis, little spots filled with a fat-like substance, cholesterol, form along the artery walls.

Formerly, scientists thought that just as old pipes in a house got rusty and worn with age, so the pipes that carry blood through the body got rough, thick and hard with age. Now it is thought that the artery-hardening process called atherosclerosis is not "the inevitable accompaniment of aging," but a result of some fault in body



NO LACE-EDGED VALENTINE—This artificial heart of glass, steel and rubber was made for work, not romance. During operations it doubles for the heart of flesh, keeping the blood circulating through the body but bypassing the real heart which the surgeon is repairing.

chemistry. Cholesterol is found in many foods, including whole milk and egg yolks. It is also manufactured in the body and is a constituent of gallstones.

Pushing along this line, scientists are using cholesterol labelled with radioactive carbon to learn more about how the body handles this fat-like chemical. In other studies, scientists are working with heparin. This chemical is an anti-clotting agent, already being put to good use to prevent dangerous blood clots in veins and arteries. But heparin has another property, that of clearing fats from the bloodstream.

This property is being studied to see whether heparin can be used to fight and perhaps forestall the deposits of fat-like cholesterolin artery walls and thus, if possible, to prevent atherosclerosis.

High Blood Pressure

Another kind of artery trouble is that which brings on high blood pressure. In this condition, the very small arteries at the ends of the blood vessel system constrict. Pumping blood through the narrowed bores of constricted arterioles takes a higher pressure. If the pressure remains higher for a length of time, it starts trouble in heart, brain and kidneys. The constriction of the littlest arteries and consequent high blood pressure may have many causes, operating alone or together. Nervous and emotional factors, hormones from the various glands, including the adrenals, and changes in body chemistry, even sodium from the salt in the diet, all seem to be involved.

Surgery in which certain nerves are cut, new drugs and diet have all helped lower blood pressure in many patients. One big need now is some method or test or series of tests to tell what is causing the high pressure in a given patient. Then doctors would know better what to prescribe.

All this research takes money as well as men. For that reason the American Heart Association this month is campaigning for new funds to finance new research to solve the big heart problem.

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TECHNOLOGY

Embroidery Machine Sews by Remote Control

➤ DEVELOPMENT OF an experimental embroidery machine that sews patterns by telegraphic orders was disclosed at a meeting of the American Institute of Electrical Engineers in New York.

The machine's needles respond to electronically punched tape at an average rate of 500 stitches per needle per minute. The color, direction and length of each stitch registers in the device in the brief time lapse between needle movements.

Control of the device is possible from anywhere in the embroidery plant, or from an office or studio miles away, Louis Casper, research engineer of the Electrotext Corporation in New York, said.

Science News Letter, February 12, 1955

OPTICAL BARGAINS

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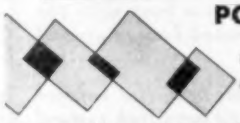

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AMERICAN BIRD SONGS: Vol. I, Second Issue—Recorded by P. P. Kellogg and A. A. Allen—*Cornell University Press*, 33 1/3 RPM, $7.75. Most of the bird songs from all parts of the U. S. on this record have been recorded since the first issue was released.

AMERICAN INDIAN AND WHITE CHILDREN: A Sociopsychological Investigation—Robert J. Havighurst and Bernice L. Neugarten—*University of Chicago Press*, 335 p., $5.00. An extensive study of psychological attitudes among Indian children compared with children from a typical white, Midwestern community.

APPROACHES TO ECONOMIC DEVELOPMENT—Norman S. Buchanan and Howard S. Ellis—*Twentieth Century Fund*, 494 p., illus., $5.00. A survey of development of the underdeveloped areas of the world with recommendations for a "bold course of action for the United States."

ATTRACTING BIRDS TO YOUR BACKYARD—William J. Beecher—*All-Pets*, 63 p., illus., paper, $1.00. Providing the bird lover with the information necessary to equip his home in order to attract and identify wild birds.

THE CHEMISTRY OF PORTLAND CEMENT—Robert Herman Bogue—*Reinhold*, 2 ed., 793 p., illus., $16.50. The director of the Portland Cement Association Fellowship at the National Bureau of Standards has incorporated recent research.

COLOR IN FOODS: A Symposium Sponsored by the Quartermaster Food and Container Institute—Kenneth T. Farrell, Joseph R. Wagner and Martin S. Peterson—*National Academy of Sciences-National Research Council*, 186 p., illus., paper, single copies free upon request to Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill. Of interest to food technologists.

DISEASES TRANSMITTED FROM ANIMALS TO MAN—Thomas G. Hull—*Charles C. Thomas*, 4th ed., 717 p., illus., $12.50.

FLOW PROPERTIES OF VINYL CHLORIDE RESIN PLASTISOLS—E. T. Severs and J. M. Austin—*Mellon Institute*, 7 p., illus., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. An example of the application of rheology to industrial problems.

HOW TO KNOW THE MINERALS AND ROCKS—Richard M. Pearl—*McGraw-Hill*, 192 p., illus., $3.50. Basic field guide for beginners to more than 125 important minerals and rocks.

I CURED MY CANCER—Mary Payne—*Vantage Press*, 69 p., $2.50. A woman's recovery from cancer through X-ray and her own determination that she would not succumb to fear.

INDUSTRIAL DETERGENCY—Wm. W. Niven Jr., Ed.—*Reinhold*, 340 p., illus., $8.75. Men in various industries tell of the methods, materials and equipment used for industrial cleaning.

INTO SPACE—P. E. Cleator—*Crowell*, 159 p., illus., $3.50. An appraisal of the interplanetary idea, made in the light of modern knowledge and technical skills by the founder of the British Interplanetary Society.

THE NIHILISM OF JOHN DEWEY—Paul K. Crosser—*Philosophical Library*, 238 p., $3.75. The author argues "the utter meaninglessness of Dewey's philosophy of science."

PROPERTY CONCEPTS OF THE NAVAHO INDIANS—Berard Haile—*Catholic University Press*—55 p., paper, $1.25.

THE SILENT WORLD—Captain J. Y. Cousteau with Frederic Dumas—*Pocket Books*, 225 p., illus., paper, 35 cents. Undersea discovery and adventure made possible by the now famous aqualung. Black and white and color photographs show scenes taken deep below the ocean's surface.

SPECIATION AND VARIATION IN ASEXUAL FUNGI—Kenneth B. Raper, Ed.—*New York Academy of Sciences*, Vol. 60, Art. 1—181 p., illus., paper, $3.50. Defining the problems that are important for a better understanding of speciation and variation in asexual fungi. These problems are acute because these microorganisms reproduce without the intervention of sexuality thus precluding a developmental stage which normally provides the most stable features.

STANDARDS FOR A STRONG AMERICA: Proceedings of the Fifth National Conference on Standards and the 36th Annual Meeting of the American Standards Association—*American Standards Association*, 99 p., illus., paper, $3.00. Papers on a wide range of subjects, including safety, international standards, purchasing, and quality control.

STORAGE BATTERIES: A General Treatise on the Physics and Chemistry of Secondary Batteries and Their Engineering Applications—George Wood Vinal—*Wiley*, 4th ed., 446 p., illus., $10.00. Reflecting the many technological advances in battery design and construction in the last few years, this book has been largely rewritten to bring the material up-to-date.

Science News Letter, February 12, 1955

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MEDICINE

Sleeping Pill Affects Sexes Differently

➤ A NEW kind of sleeping pill which is twice as effective in women as in men was announced by Dr. F. F. Yonkman of Ciba Pharmaceutical Products, Inc., in Summit, N. J.

The new drug is a glutethimide tradenamed Doriden. One white, uncoated and practically tasteless tablet will usually within 15 to 20 minutes put a person to sleep for four to eight hours.

Tests so far show the drug to be nonhabit-forming, safe even in relatively large quantities and without "hangover" effect. When given to students, it took five times the recommended dose to interfere with manual and mental performance.

It is said to show promise for elderly patients suffering from insomnia, for epileptics, some mental patients, and as a sedative before surgical operations.

Science News Letter, February 12, 1955

ASTRONOMY

New Stars Are H-Bombs

Theory proposes that part of a large cloud of hydrogen gas becomes unstable and a star is born in a cosmic explosion that hurls non-ionized gas outward at 12 miles per second.

➤ STARS BEING born are cosmic hydrogen bombs, exploding in dense interstellar clouds, according to a new theory on the results of star formation presented to the American Physical Society meeting in New York by Dr. Malcolm Savedoff of the University of Rochester, Rochester, N. Y.

He drew a mathematical picture of stellar birth within one of the vast clouds of hydrogen gas that dot the reaches of space between stars. Dr. Jan H. Oort of Leiden Observatory, The Netherlands, and Dr. Lyman Spitzer of Princeton Observatory, Princeton, N. J., proposed the ideas that triggered Dr. Savedoff's investigation of "the gas dynamic effects of star formation."

Dr. Savedoff suggests that in a big cloud of hydrogen gas, part of the cloud becomes unstable and a star is formed. Ultraviolet radiation from the star ionizes the gas immediately around it. This ionized gas pushes the neutral, or non-ionized, gas around it away at the high velocity of 12 miles per second. Speed of sound in air being about one-fifth of a mile per second, the velocity of this expanding gas is at least 60 times as fast as present-day jet planes.

In front of the expanding gas is a shock wave, an invisible wall rushing ahead in warning of the high pressures behind it. Beyond the shock wave is a region, still within the great hydrogen cloud, that does not know anything is going on.

The effect can be likened to the difference between lighting a match and a firecracker. The match is designed to burn slowly, a little at a time. When a firecracker is set off, a comparatively large amount of matter is excited very quickly, resulting in an explosion. Dr. Savedoff's cosmic bombs are hydrogen firecrackers of gigantic proportions exploding now.

Best evidence for current stellar formation, Dr. Savedoff told a symposium of the Physical Society's division of fluid dynamics, is the fact that the brightest stars radiate energy so furiously their fuel supply, which is hydrogen, would be exhausted in ten million years.

Recent studies of the apparent motions of stars have revealed groups that seem to be expanding from a point, and the age of such stellar clusters is estimated at only two million years. Currently, the age of the universe is thought to be about five billion years. These infant stars are bright blue stars, a million times brighter than our sun, found in what astronomers call "O" associations, always seen close to dense interstellar clouds.

Dr. Savedoff worked out this theory in collaborating with John Greene, who is studying for his Ph.D. at the University of Rochester.

When a star is formed outside of a hydrogen cloud, Drs. Spitzer and Oort have proposed that ionization of gas on the side of the cloud close to the intense stellar ultraviolet light leads to a rocket-like effect, the cloud losing protons and electrons from its surface, and gaining momentum. Large velocities would result when a large fraction of the original mass of the cloud is thrust away.

Dr. F. Kahn of Manchester University, England, after further investigation concluded that this "rocket" effect would occur.

Science News Letter, February 12, 1955

ENGINEERING

Fight Machine Noise By Adding More Noise

➤ ENGINEERS HAVE taken a roaring electric power transformer and quieted it down by adding more noise.

This feat, disclosed in New York at a meeting of the American Institute of Electrical Engineers, was made possible by the phenomenon of wave cancellation. Two identical sound waves can completely wipe each other out when they are out of phase, that is when the crest of one corresponds to the valley of the other. Thus, under certain conditions two noises, no matter how loud they are, can be combined to produce complete silence, at least theoretically.

The experiment with the noisy transformer has not gone that far, W. B. Conover and R. J. Ringlee of the General Electric Co., Pittsfield, Mass., explained, but they have produced what they called a "beam of silence."

The beam eliminates much of the noise from the transformer in a 30-degree angle. They called the effect "astonishing" and said that once the electronic adjustment had been made they could turn the transformer noise off or on at will merely by switching their loudspeakers on or off.

The equipment, they said, was much cheaper than conventional sound barriers and it promises to be "by far the most economical and satisfactory solution for noise problems where a limited area only is involved."

The direction of the "beam of silence" could be changed by adjusting the syncopated phase of the loudspeaker noise. It was pointed out, however, that although noise is reduced in one direction there is more noise in other parts of the room.

Science News Letter, February 12, 1955

PHILOSOPHICAL LIBRARY BOOKS

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☐ **BABA OF KARO.** A Woman of the Moslem Hausa by Mary Smith. This remarkable book contains what is probably the first full-scale autobiography of an African woman. Mrs. Smith, who speaks fluent Hausa, became Baba's friend while her husband, Dr. M. G. Smith, a social anthropologist, was engaged in field work in Nigeria. After many conversations between the two women, Baba agreed to dictate the story of her life. Dr. Smith contributes an essay on Hausa life and sociology to provide the background. $7.50

☐ **CAPRICORN ROAD by Francois Balsan.** An unusual travel book, telling the story of the first expedition to cross Southern Africa from the Atlantic Coast to the Indian Ocean in 1951, sponsored by the Societe Panhard and its South African representative, Unic-French Industries. The expedition rediscovered the Lost City to the east of the Nosop River, reported by Farini in 1885. This is a faithful account of the penetration of practically unexplored territory by man and machine. The team consisted of nine men led by the author of this book, a well-known explorer and geographer. Illustrated. $4.75

☐ **ETRUSCAN ART by P. J. Riis.** This book is what might be called a collection of archaeological essays on the art from which Roman art was gradually developed, the art of the Etruscans, also the art of early Rome. The principal aim of the book is to widen the circle of knowledge already established by the university world of modern scholars in this particular field. Bibliographical notes added to the individual chapters will make the book useful to the student as well. The author is Professor of Archaeology at the University of Copenhagen. Illustrated. $10.00

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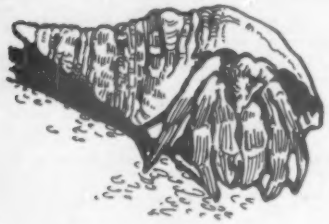

Hermit Crab

➤ CRABS ARE delicacies of the dinner table, usually served, for the sake of "atmosphere," cooked and stuffed back into their own shells.

The edible crabs of the world belong to a relatively small group of species. The inedible kinds of crabs outnumber the species of positive economic value many fold and include a host of species of interesting and often weird appearance.

Among these are the hermit crabs. They are not really crabs at all in the true sense, although they have been given the name in common parlance. They probably originated from burrowing ancestors whose tails had become soft and flexible. When they gave up burrowing, they had to protect their tails by pushing them into shells.

The hermit crab can often be seen among the rocks during a seaside vacation. In spite of the name, it cannot be truly said to have a crusty disposition, except perhaps about its head and claws. This lack of the natural crust with which all other crabs are endowed is what determines its peculiar custom of inhabiting the deserted dwellings of departed sea snails.

If you see a small curled sea-shell hustling along in a shallow tidal pool, at a good deal faster clip than its proper owner could ever have carried it, the present tenant is almost certain to be a hermit crab. If you capture such a shell and try to pry the little creature out, you will have no luck, for the crab sticks as tight in the shell as did the snail that grew in it originally. If you persist, you can pry the crab out—but it will be in pieces.

Hermit crabs grow, just as other crabs do, but instead of cracking a shell and molting, or shedding it, the hermit must abandon his adopted quarters when they begin to cramp him and seek new ones.

This is because his body is permanently in the unprotected "soft-shell" state. The search for new living quarters is a time of anxiety for the temporarily homeless crab. Sometimes, two houseless hermit crabs, happening simultaneously upon a suitable empty shell, will stage a fierce battle for its possession. For this pugnacity, the species is sometimes called the soldier crab.

Science News Letter, February 12, 1955

METEOROLOGY

Propose New Theory Of Lightning Formation

➤ A NEW theory of "bootstrap" electrification to cause lightning, occurring long before rain begins, was proposed to weathermen attending the American Meteorological Society meeting in New York.

Dr. Bernard Vonnegut, a pioneer in "rain making" who is now a physicist at Arthur D. Little, Inc., said that his theory, if correct, may play a prominent part in the formation of rain. He described his theory as follows:

Air near the surface of the earth carries a slight positive charge. Strong updrafts sweep this positively charged air to upper levels to form positively charged clouds. Negative ions from the upper atmosphere are attracted to the clouds, attach themselves to cloud particles and change into ions of low mobility.

These negatively charged particles are swept by downdrafts to the lower part of the cloud in a continuous process that results in a strong negative charge accumulating in the lower part of the cloud.

When this negative charge becomes sufficiently large, it causes a discharge of positive ions from points on the earth's surface. They attach themselves to the fine particles always present in the air at low levels and are transformed into ions of low mobility.

These positive ions are then carried to the upper part of the cloud by updrafts, thus increasing the positive charge in the upper part of the cloud. This increase in the positive charge raises the negative charging rate, intensifying the negative charge on the lower part of the cloud.

The result is a "bootstrap" electrification process in which the charges build up until large enough to produce lightning.

At the present time it is generally believed that the electrification is caused by the falling of charged precipitation particles, although no satisfactory theory has been advanced to explain this process.

Science News Letter, February 12, 1955

AERONAUTICS

"Tennis Net" Tested For Landing Fields

➤ ENGINEERS HAVE stretched a nylon tennis net across a miniature landing field and are "serving" model F-86 Sabre jets into it.

The purpose of the experiment is to test a new device, called a "rabbit catcher," designed to span the end of a runway. When a jet coming in for a landing overshoots the field, it will plow into the net, stretch it forward, then come to a halt without damage to plane or barrier.

To test this theory, scientists of the All American Engineering Co. at Georgetown, Del., have constructed model jets, a model runway and a model net, all scaled down to one-tenth life size. The "jets" are shot into the net from a catapult.

Unlike players, the scientists hope their shots will not hop over the net.

Science News Letter, February 12, 1955

VIROLOGY

Viruses Help Identify Tuberculosis-Like Disease

➤ PLANT-LIKE ORGANISMS that cause a tuberculosis-like disease may be identified by viruses that prey upon these organisms.

The viruses were isolated by Drs. Orda Plunkett and E. N. Azarowicz of the University of California at Los Angeles. They attack only fungi of the genus *Nocardia*, which cause such diseases as nocardiosis, a pulmonary disease resembling tuberculosis.

The viruses are of no value as remedies against fungus diseases. However, they may be of special value in identifying fungus organisms, which are often difficult to distinguish from each other and from other organisms.

For example, some strains of *Nocardia* so closely resemble the TB germ as to cause an erroneous diagnosis.

Fungal viruses were first discovered two years ago by Drs. Plunkett and Azarowicz. Although bacterial viruses have been known for years, no one had been able to isolate the fungal variety prior to that time.

Science News Letter, February 12, 1955

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AUTOMATIC SPRINKLER control for lawns solves the problems of water restrictions during shortages and sprinkling during vacations. Twenty-four-hour dial permits tripper arms to be set for the exact times when sprinkling is to begin and stop.

Science News Letter, February 12, 1955

PLASTIC TAPE for joining cold and warm air ducts and sealing the joints in home and industrial heating installations is flame resistant. Designed for a one-wrap use on ducts, the tape withstands temperatures up to 240 degrees Fahrenheit.

Science News Letter, February 12, 1955

LIQUID GRAPHITE pencil writes an erasable "lead" line like any other pencil, but will never wear or break its point. Capable of drawing a straight line three miles in length, the liquid graphite completely eliminates sharpening, as well as width variance in the lettering.

Science News Letter, February 12, 1955

PORTABLE GAS lantern provides a source of instant lighting for use by hunters or campers outside, or for emergencies in the home. Operating on a safe, disposable steel cylinder of propane gas, the lantern, shown in the photograph, will burn brighter than a 100-watt bulb for nine hours on one fuel cylinder.

Science News Letter, February 12, 1955

PARLIAMENTARY SLIDE rule settles questions of procedure in seconds for committees and meetings. The transparent plastic slider gives answers to eight basic questions on 36 possible motions. Chart is based on "Robert's Rules of Order Revised."

Science News Letter, February 12, 1955

ZIGZAG STITCHER can be quickly attached to sewing machines to allow decorative stitching described as possible in the past only on certain automatic machines. The automatic device is available in a wide variety of stitch patterns.

Science News Letter, February 12, 1955

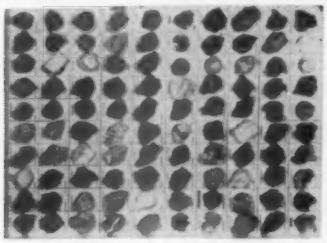
MAGNETIC SOAP holder imported from Denmark has a permanent magnet imbedded in its plastic body to hold soap in place. A small metal cap is pressed into the soap to hold it to the magnet. Installed in 60 seconds, the magnetic holder eliminates messy soap dishes.

Science News Letter, February 12, 1955

IRONING BOARD cover has been treated with silicones and other chemicals to make it scorch-resistant. The "maglacized" cover "reflects" back enough heat from the iron to automatically iron the underside of a garment. Fitting all standard sized boards, the cover is also stain-resistant and needs no laundering.

Science News Letter, February 12, 1955

MINERAL AND GEM SETS



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Questions

ENGINEERING—Explain how you can reduce the volume of sound by adding more sound. p. 109.

□ □ □

MEDICINE—About how far away from an atomic blast should drugs be in order to be safe? p. 101.

□ □ □

PALEONTOLOGY—What is the name of prehistoric horse that roamed southwestern Wyoming? p. 104.

□ □ □

PHYSICS—What are some of the new uses scientists are making of atomic waste? p. 100.

□ □ □

TECHNOLOGY—What is the range of frequencies that are proposed for use in the new telephone waveguides? p. 99.

□ □ □

Photographs: Cover, Bell Telephone Laboratories; p. 99, Bell Aircraft Corp.; p. 101, Massachusetts Institute of Technology; p. 102, Hamilton Wright; p. 103, American Museum of Natural History; p. 106, American Heart Assn.; p. 111, Otto Bernz Co.

By H. A. MURRAY, M.D.

Author of **The Golf Secret.** The discoverer of the simple "left-shoulder method" that quickly helped thousands to power and accuracy in the golf swing, has just written a new book, **MORE GOLF SECRETS.**

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Do You Know?

The *ostrich* cannot fly, but its 12-foot stride carries it along at 40 miles an hour.

In 1955 there will be three *eclipses,* two of the sun and one of the moon, but none will be visible in the United States.

About 500,000 deaths are caused annually in this country by physical deterioration resulting from *hypertension,* it has been estimated.

The *echidna,* a porcupine-like animal, and the duck-billed platypus are the only living mammals that lay eggs; they both come from Australia.

A high speed *electronic "brain"* will be used to calculate the settings of valves and fire the stills at an oil refinery in Paulsboro, N. J.

The *life expectancy* in India has risen from 27 to 32 years in the past five years and the infant mortality rate has dropped from 158 to 124 per 1,000.

A 27-mile *ropeway* high in the Himalayas is being built to speed trade between Tibet and northern India; a series of trestles support the freight-carrying aerial cables.

The emission rate of low-activity radioactive sources can be determined precisely by a radiation-balance microcalorimeter, which measures the minute amounts of heat energy which accompany the *radiation.*

Lungfish, which have both gills and a modified lung, are considered "living fossils"; all three species find it necessary to surface occasionally to take a gulp of free air, and some varieties will drown if forced to stay under water.

Science News Letter, February 12, 1955

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BRAHMS
The Academic Festival
Utrecht Symphony, Paul Hupperts, Conducting

BERLIOZ
The Roman Carnival
Netherlands Philharmonic Orch., Walter Goehr, Conducting

VIVALDI
Concerto in C for Two Trumpets and Orchestra
Netherlands Philharmonic Orch., H. Sevenstern and F. Hausdoerfer, Trumpeters, O. Ackermann, Cond.

WAGNER
Die Meistersinger, Prelude, Act 1
Zurich Tonhalle Orch., Otto Ackermann, Conducting

BACH
Toccata and Fugue in D Minor
Alexander Schreiner at the Organ of the Tabernacle, Salt Lake City

DUKAS
Sorcerer's Apprentice
Utrecht Symphony, Paul Hupperts, Conducting

MOUSSORGSKY
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